UNIVERSITY OF ILORIN

THE TWO HUNDRED AND TWENTY-FOURTH (224TH) INAUGURAL LECTURE

"LOOKING THROUGH A TUBE TO SEE THE WORLD WITHIN THE TUBE – EXPERIENCES AND CHALLENGES OF GASTROINTESTINAL ENDOSCOPY IN NIGERIA"

By

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UNIVERSITY OF ILORIN, ILORIN,NIGERIA

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The Vice Chancellor

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Distinguished students of Medicine
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Preamble

I thank the almighty Allah (SWT), the creator of the universe, for preserving all of us to see today. I also want to thank you Sir, Mr. Vice Chancellor, for giving me the opportunity to deliver this inaugural lecture to showcase my modest contributions to knowledge in the field of Gastrointestinal Endoscopy. This is the Seventh (7^{th}) in the series of inaugural lectures from the Department of Medicine, and Two Hundred and Twenty-fourth (224^{th}) in the University of Ilorin. The first from the Department of Medicine was "The Normal

Electrocardiogram (ECG) in Adult Nigerians" delivered by Prof Matthew A. Araoye on the 24th April, 1986 as the 22nd in the University. The second was "Of Bacterial Pathogens and Diarrhoea: Making Visible the Invisible Link" delivered by Prof Bababode J. Bojuwoye on the 13th May, 2004 while the third "The Choice is yours but the Burden is Ours" was delivered by Prof Ibrahim A. Katibi on the 28th March, 2013. The fourth from the Department titled "Towards Better Prevention/Control of Hypertension and Diabetes" was delivered by Prof Emmanuel O. Okoro on 27th February, 2014 while the fifth titled "Realities of Living with HIV Infection" was presented by Prof Alakija K. Salami on the 26th June, 2014. The sixth titled "Behaviour of an amazing organ, even at the expense of its survival: Nihil est Mali Apud Nigros" was delivered by Prof. Adindu Chijiokeon the 30th November, 2017.

Today, I feel highly honoured and privileged as I stand before this very august assembly of highly revered intellectuals to deliver this lecture from my Department, titled "Looking Through A Tube To See The World Within The Tube – Experiences And Challenges Of Gastrointestinal Endoscopy In Nigeria". It is my candid desire that this discourse will immensely add value to the field of Gastrointestinal Endoscopy not only in Nigeria, but the world at large.

Introduction

Mr Vice Chancellor, Sir, before I delve into the substance of this lecture, permit me to introduce to you the Gastrointestinal(GI) tract, and the field of GI Endoscopy.

The Normal Structure and Functions of the Gastrointestinal Tract

The GI tract is an array of complex tube arrangement that extends from the mouth and ends as the anus.

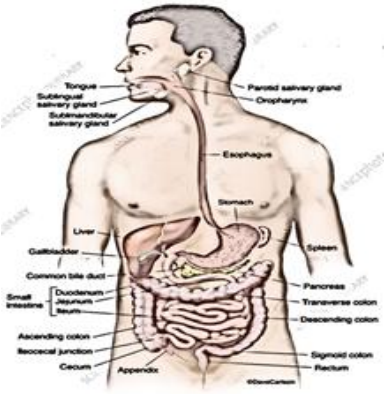


Figure 1: The human Gastrointestinal tract
Source: *https://www.google.com/gastrointestinaltract* (*modified*)

Functions of the gastrointestinal tract

The GI tract performs several functions of which the six main ones are: i. ingestion ii. motility iii. mechanical digestioniv. chemical digestion v. absorption and vi. defecation

i. Mouth – mastication (breaking down large food particles into smaller ones), lubrication (mixing food particles with saliva), and deglutition (swallowing of food)

ii. Oesophagus – serves as a conduit between the mouth and stomach

iii. Stomach - is a hollow organ, or "container," that holds food while it is being mixed with stomach digestive enzymes. These enzymes continue the process of breaking down foods into usable forms. Cells lining the stomach secrete mucin, gastrin, hydrochloric acid (HCl), intrinsic factor,and pepsin responsible for the breakdown process. When the contents of the stomach are processed enough, they are released into the small intestine.

iv. Small intestine – it is 7 metres long, and has 3 segments – duodenum, jejunum, and ileum. Food is

further digested with enzymes (Trypsin, Amylase, and Lipase) released by the pancreas,and bile from the liver. The duodenum is largely responsible for the continuous breaking-down process. The jejunum and ileum are mainly responsible for the absorption of nutrients into the bloodstream.Once the nutrients have been absorbed and the liquid leftover-food residue has passed through the small intestine, it then moves on to the large intestine, or colon.

v. Large intestine (Caecum, Colon, Rectum, Anal canal and Anus) - it is about 1.2 metres long. Partially digested foods pass from the small to the large intestine within 8-9 hours of ingestion. The small intestine would have absorbed about 90% of the ingested water. The large intestine absorbs most of the remaining water, a process that converts liquid chyme residue into semi-solid stools or faeces. The large intestine has three major functions: a. absorption of water and electrolytes; b. formation and transport of faeces; c. chemical digestion by gut microbes.

Diseases of the gastrointestinal tract

These are classified into two types: **Functional** and **Structural**

Functional GI disorders: Functional gastrointestinal disorders (FGID) are a group of disorders characterised by chronic GI symptoms (eg abdominal pain, dysphagia, dyspepsia, diarrhoea, constipation and bloating) in the absence of demonstrable pathology on conventional testing. Historically, they were defined as conditions which had no organic basis, but this definition has evolved with increasing understanding of these conditions and we now know that they arise due to alterations in brain–gut communication. The current classification system (Rome IV) divides them into 33 adult disorders, and 20 paediatric disorders. The most common subtypes being irritable

bowel syndrome (IBS) which causes abdominal discomfort, altered bowel habit and bloating; and functional dyspepsia (FD) which causes epigastric pain or discomfort, often related to eating which can be associated with fullness and satiety.

Functional GI disorders (e.g. **Irritable Bowel Syndrome** and **Functional Dyspepsia**) are very common conditions which are associated with very poor quality of life, and high healthcare utilisation.

Irritable Bowel Syndrome

This is the most common form of FGID. It is characterised by recurrent abdominal pain, of an average episode of at least 1 day/week in the last 3 months, associated with two or more of the following criteria: related to defecation, associated with a change in frequency of stool, or associated with a change in form (appearance) of stool.

Functional Dyspepsia

This is the second most common FGID and can be divided into Epigastric Pain Syndrome (EPS), characterised by epigastric pain and burning unrelated to meals, and Postprandial Distress Syndrome (PDS) which causes early satiety, postprandial fullness, nausea and epigastric bloating. A proportion of patients with FD will also have mild to moderate delays in their gastric emptying.

Functional GI Disorders are caused by environmental factors such as stress and smoking; disorders of GI functioning namely: altered gut sensitivity, motility, microbiota, immune functioning; and central nervous system processing. FGIDs cause chronic symptoms throughout the gut such as pain, dyspepsia and altered bowel habit, all of which are made worse by maladaptive patient behaviours, stress and psychological comorbiditysuch as anxiety and depression. The management of FGIDs is by a biopsychosocial approach involving changes in lifestyle and diet, addressing coexisting psychological comorbidity, and using medicationto treat underlying pathophysiology. Pharmacological

treatment with anti-spasmodics, neuromodulators, motility agents and anti-depressants is effective. Psychotherapy in motivated individuals is equally effective.

Structural GI disorder: These are caused by abnormalities in the GI tract. Common examples include strictures, stenosis, haemorrhoids, diverticular disease, colon polyps, colon cancer, colitis which may be infectious, ischaemic, radiation-induced, or inflammatory bowel disease (IBD), and anal fistulas.

Symptoms of GI disorders

Common GI symptoms include: i. Abdominal discomfort (bloating, pain or cramps), ii. Unintentional weight loss, iii. Vomiting and nausea, iv. Acid reflux (heartburn), v. Diarrhoea, constipation (or sometimes both), vi. Faecal incontinence, vii. Fatigue, viii. Loss of appetite, and ix. Difficulty swallowing

Investigations of the Gastrointestinal Tract

In order to evaluate the GI tract, we need a detailed history, a proper physical examination, as well as relevant investigations (Laboratory and Imaging)

Laboratory investigations:

Laboratory and microbiologic tests may be used to (a) assess organ function, (b) screen for some GI disorders, and (c) evaluate the effectiveness of therapy

Imaging tests include:

I. Radiology

Radiologic procedures rely on the differential absorption of radiation of adjacent tissues to highlight anatomy and pathology.

Radiologic procedures important in evaluating the

GI tract include:

i. Plain radiography, ii. Upper GI series, iii. Lower GI series, and iv. Enteroclysis

II. Ultrasonography

Ultrasonography scan (USS) uses high-frequency sound waves to create images of the inside of the body. It provides images of deeper structures such as the gallbladder, liver, pancreas, and abdominal wall. Examples of USS are Endoscopic ultrasound, Doppler ultrasound, Colour Doppler, Duplex ultrasound, Triplex ultrasound (colour-flow imaging) etc.

III. Computerized tomography scan

Computerized tomography (CT) or computed axial tomography (CAT) scan combines a series of X-ray images taken from different angles around the body, and uses computer processing to create cross-sectional images (slices) of the bones, blood vessels and soft tissues. It provides more-detailed information of the GI system than plain X-rays. Contrast agents may be used.

IV. Radionuclide Imaging

Radionuclide imaging involves injection of a radiolabelled tracer which contains a radioactive isotope bound to a complex or molecule, which determines its kinetics and distribution in the body, and hence the type of physiological process studied. It also uses a computerized detection camera to gather images of metabolic and physiological processes at the molecular and cellular level.

V. Magnetic Resonance Imaging

Magnetic resonance imaging (MRI) scanners use strong magnetic fields, magnetic field gradients, and radio waves to excite the nuclei of hydrogen, phosphorus, oxygen, and other elements. The radiofrequency signals generated are manipulated

and recorded by a computer, and a two-dimensional image representing organs or sections of the body studied are produced.

VI. Computed tomography (CT) colonography

Computerized tomography colonography is a virtual colonoscopy that uses CT scanning or MRI to produce two- and three-dimensional images of the colon, from the rectum to the caecum, and displays the images on an electronic display device.

VII. Endoscopy

Refinement in optical engineering and fibre-optics has made possible the development of the Endoscope, which has revolutionized the management of GI disorders. An endoscope is an illuminated optical instrument designed to inspect the interior of the GI tract. Endoscopes enable the physician to inspect intraluminal mucosal lesions, and to obtain biopsies and washings for cytology studies. The most commonly used endoscopic studies are Oesophagogastroduodenoscopy, Enteroscopy, Colonoscopy, Sigmoidoscopy, Proctoscopy, Anoscopy, Endoscopic Retrograde Cholangio-pancreatography, Magnetic Resonance Cholangio-pancreatography, Capsule endoscopy, and Endoscopic ultrasound.

a. Oesophagogastroduodenoscopy

Oesophagogastroduodenoscopy (OGD) also called Gastroscopy is used to examine the oesophagus, stomach, and duodenum. Patient preparation for OGD includes fasting for 6 to 8 hours prior to the procedure, and the administration of sedatives and topical anaesthetics. Common indications may be either diagnostic or therapeutic in nature, and include evaluating dyspepsia, dysphagia, odynophagia, anaemia, suspected upper GI bleeding, GI obstructions, upper

abdominal pain, persistent vomiting, unexplained weight loss, and radiographic abnormalities. OGD commonly uncovers peptic ulcers, and other lesions (figure 2).

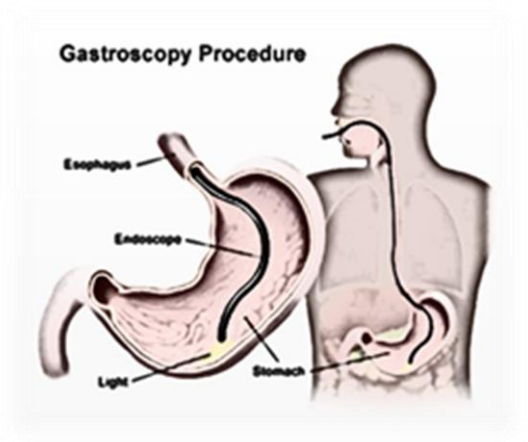


Figure 2: Flexible Gastroscopy

Source:*https://www.google.com/gastroscopy* (*modified*)

b. Colonoscopy

Colonoscopy is used for direct visualization of the lumen of the large intestine and rectum. To prepare for colonoscopy, the patient should fast for about 8 hours prior to the examination, and bowel cleansing should be completed. Agents such as midazolam and meperidine are usually given to produce conscious sedation, and analgesia. Similar to upper GI endoscopy, indications for colonoscopy can be either diagnostic or therapeutic, and include evaluation and detection of abnormalities visualized by radiography, GI haemorrhage, colonic lesions, volvulus, IBD, diverticular disease, colorectal cancer, and excision of colonic polyps etc (figure 3).

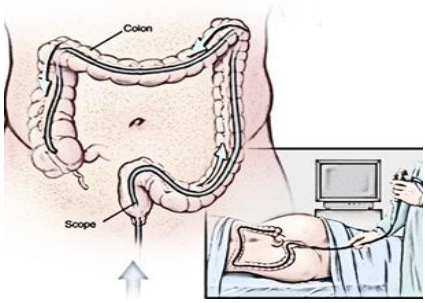


Figure 3: Flexible Colonoscopy

Source:*https://www.google.com/colonoscopy* (*modified*)

c. Sigmoidoscopy

Sigmoidoscopy is used to evaluate the sigmoid colon and rectum. Flexible sigmoidoscopy has virtually replaced rigid sigmoidoscopy because of increased patient comfort and superior performance. The major indication for this examination is to evaluate symptoms related to the colon or rectum, and to conduct screening of asymptomatic patients for colon polyps or cancer. Patient preparation involves abstinence from eating or drinking 6 to 8 hours prior to the procedure, and administering bowel-cleansing agents.

d. Anoscopy

Anoscopy is an examination of the anal canal and rectum with an anoscope. An anoscope is a small-diameter plastic or metal hollow tube (slightly wider than a finger) with an insert called an obturator. The device is about 5 inches long. The major indications for anoscopic examination include symptoms related to the anus and rectum, such as bleeding, protrusions or swelling, pain,

and severe itching. Patients undergoing sigmoidoscopy or anoscopy generally do not require sedation (figures 4 and 5).

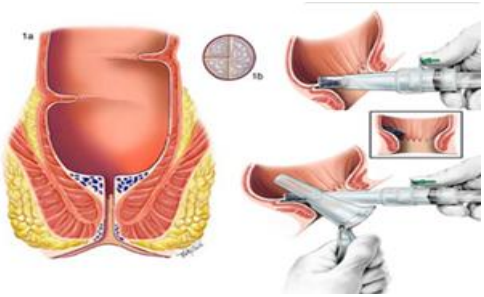


Figure 4: Anoscopy

Source:*https://www.google.com/anoscope*

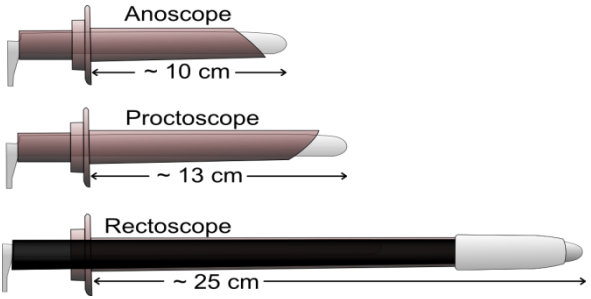


Figure 5: Lower GI Endoscopes

Source:*https://www.google.com/anoscope*

e. Endoscopic Retrograde Cholangiopancreatography

Endoscopic Retrograde Cholangiopancreatography (ERCP) is a technique that combines the use of Endoscopy and Fluoroscopy to diagnose, and treat certain disordersofthe biliaryorpancreatic ductal systems. It is a diagnostic and therapeutic procedure primarily performed by highly skilled and trained Gastroenterologists.

f. Magnetic Retrograde Cholangiopancreatography

Magnetic Retrograde Cholangiopancreatography (MRCP)is an alternative to diagnostic ERCP. It is non-invasive, and is used to diagnose or assess conditions such as stones in the biliary or pancreatic ducts, tumours, inflammation of the gallbladder, bile duct, liver, pancreatic duct, or pancreas (pancreatitis). It is a diagnostic but not therapeutic procedure.

g. Capsule Endoscopy

Capsule endoscopy is a procedure that involves swallowing a small capsule, which is the size of a large vitamin pill. Inside the capsule is a tiny wireless camera that takes pictures as it passes through the GI tract. Images are transmitted to a recording device worn on a belt around the waist. Patients return the recording device to the Physician so that the images can be downloaded to a computer and evaluated. Eventually, the camera is naturally excreted and retrieved. With newer developments, the capsule can now be used to take biopsies and release medications at specific locations of the entire GI tract (figure 6).

Figure 6: Capsule Endoscopes
Source:*https://www.google.com/capsuleendoscope(modified)*

h. Endoscopic Ultrasound

Endoscopic ultrasound (EUS) is a minimally invasive procedure to assess the GI tract and other nearby organs and tissues. It combines the use of a thin, flexible tube (endoscope) inserted into the GI tract and a device that uses high-frequency sound waves to create detailed

images of the GI tract and surrounding organs and tissues, including the lungs, pancreas, gall bladder, liver, and lymph nodes. The endoscopic tube may also have a small needle to remove fluid or tissue samples (biopsy). This procedure is called EUS-guided fine-needle aspiration or EUS-guided fine-needle biopsy. Other EUS-guided procedures can be used to drain fluid from a lesion or inject a drug at a specific site.

Gastrointestinal Endoscopy

a. History of Gastrointestinal Endoscopy

Gastrointestinal endoscopy has been developing from rudimentary beginnings for more than 100 years now. Technological advances have accelerated in the last 30 years, transforming image quality, and allowing the passage of endoscopes to previously inaccessible organs. Endoscopic techniques have become more sophisticated and training has been regulated and standardized, making this powerful diagnostic tool safer and more effective. Therapeutic interventions are also more advanced, meaning that endoscopy may increasingly be used as a viable alternative to surgery (Timothy & Corinne, 2020).In recent years, GI endoscopy has developed rapidly, and hence evolved from a simple GI tract diagnostic method to painless minimally invasive treatment, and extra-luminal organs diagnostic procedure (Chen et al, 2016).

The requirements for efficient endoscopic visualization and instrumentation have increased over the past decade given the considerable burden that luminal disorders of the GI tract exert on individuals and healthcare economies. The push for greater diagnostic yield has driven advances in optical physics and bioengineering, which are revolutionizing diagnostic and therapeutic GI endoscopy (Mohammed et al, 2019).

In its 200 years of development history, GI endoscopy has gone through the following 4 stages: i. **Rigid endoscopy**, ii.

Semi-flexible endoscopy, iii. **Fibreoptic endoscopy**, and iv. **Electronic endoscopy and ultrasonic endoscopy**. In terms of endoscopic diagnosis and treatment, new technologies such as Chromoendoscopy, NarrowBand Imaging (NBI), Magnifying Endoscopy and Endoscopic Mucosal Resection (EMR), Endoscopic Submucosal Dissection (ESD),Endoscopic Retrograde Cholangiopancreatography (ERCP), Magnetic Resonance Cholangiopancreatography (MRCP) are constantly emerging. The emergence of Endoscopic Ultrasonography (EUS) and Natural Orifice Transluminal Endoscopic Surgery (NOTES) was a breakthrough from the previous GI endoscopy blind area in the biliary and pancreatic system and other nearby organs. A series of new GI endoscopic techniques are used in clinical practice which enabled GI physicians to make great strides in areas that were previously inaccessible, and ultimately, these advances benefited patients(Yang et al, 2019).

b. Evolution of Gastrointestinal Endoscopy

Upper GI endoscopy is a standard technique that provides direct visualization of the GI tract from the oesophagus through the stomach, duodenal bulb, and descending duodenum. The technique is mostly performed perorally, however, newly designed ultraslim endoscopes with a tip of 5 mm diameter also allow transnasal endoscopy. This might improve the patient's tolerance and reduce the need for sedation. However, in western countries unsedated trans-nasal endoscopy has not been widely adopted (Meves, 2012).

The development of endoscopy is a testimony to human ingenuity. Instruments have evolved from dangerous straight tubes, illuminated by light reflected from candles, to more flexible and safer instruments with an image transmitted through a series of prism lenses and illumination by an electric light bulb, to images transmitted through fibre-optic bundles with illumination transmitted by fiber bundles from an external source, to our present remarkably safe electronic instruments with digital images transmitted to a video screen through wires

and processed by computers. Most recently, we can visualize the lumen of the gut without touching the patient. Now we not only can visualize, obtain biopsy tissue, and perform procedures within the hidden cavities of the body, but also directly and indirectly see beneath the mucosa and into immediately adjacent organs. The evolution of GI endoscopy is a truly remarkable story, and advances in the diagnostic and therapeutic capabilities of these instruments continue to be made at a rapid pace. To know and understand what has occurred previously lends strength to efforts toward achieving what is to come (James et al, 2019).

Figure7: Rigid Oesophagoscope
Source:*https://www.google.com/oesopagoscope*

Figure8: Rigid Oesophagoscopy
Source:*https://www.google.com/oesophagoscopy*

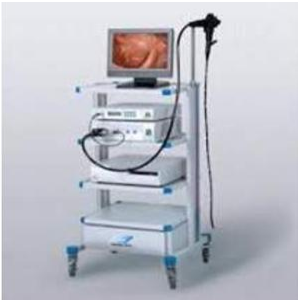


Figure9: Video Gastrointestinal Endoscopy
Source:*https://www.google.com/giendoscope*

MY EXPERIENCES IN GASTROINTESTINAL ENDOSCOPY

Mr. Vice Chancellor sir, my first encounter with GI endoscopy was during my senior Residency training programme in Gastroenterology and Endoscopy under Professors Dennis A. Ndububa and Anthony O. Arigbabu at Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) in 2004. Under them, I received training in the basic rudiments of GI Endoscopy.

► After my West African College of Physicians (WACP) Fellowship exams in April 2005, I set up a private GI endoscopy service in a private hospital in Ilorin in 2005. An Olympus fibre-optic Gastroscope was used for mainly diagnostic endoscopy.

► Also, in 2005, I assisted in setting up the GI endoscopy unit at ECWA Hospital, Egbe in Kogi State. This was mainly with the use of an Olympus fibre-optic Gastroscope for diagnostic endoscopy. I was driving from Ilorin, Kwara State to Egbe in Kogi State at weekends to operate the GI endoscopy machine over a period of about 2 years.

► In late 2006, I was commissioned to set up the GI endoscopy unit, and also train Doctors and Nurses in GI endoscopy at Modibbo Adama University Teaching Hospital (formerly Federal Medical Centre), Yola, Adamawa State. We initially

started with a Fuji non fibre-optic Gastroscope but later upgraded to an Olympus Video Endoscopy system for upper and lower GI endoscopy involving both diagnostic and therapeutic procedures. This I did from 2006 to 2013.

► In late 2008, I won a research grant of Two Million Seven Hundred and Twenty Five Thousand Naira (N2,725,000.00) from Mega life Sciences Nigeria Ltd to carry out an endoscopy-based study, titled "Randomized comparative study of Rabeprazole (Barole) versus Omeprazole in Helicobacter Pylori eradication in Peptic Ulcer Disease patients in Ilorin, Kwara State". From the grant, a Pentax Video Endoscopy system was procured (Gastroscope and Colonoscope) for diagnostic and therapeutic purposes.

► In February 2010, I underwent advanced training in GI endoscopy at the famous Academic Medical Centre, Amsterdam, The Netherlands. The trainings were on GI endoscopy, ERCP, MRCP, EUS, amongst others. On my return, I established GI endoscopy services at a private hospital in Ilorin- Crescent Gold Crown Hospital, Ilorin for gastroscopy and colonoscopy (diagnostic and therapeutic).

► In 2011, the GI endoscopy unit of University of Ilorin Teaching Hospital (UITH), Ilorin was established.

► In 2013, I was part of the National Cancer Institute (NCI), United States of America (USA) pilot grant received by African Research Group on Oncology (ARGO) in partnership with Memorial Sloan Kettering Cancer Centre (MSKCC) New York, USA. The grant was for a multi-centre study collaboration involving MSKCC New York, OAUTHC Ife, UITH Ilorin, FMC Owo, LAUTECH Osogbo, Surgery and Trauma Centre, Ondo on 'Developing Colorectal Cancer Biobank and Database in Nigeria (Prospective Study) – a multi-centre study'. It was an NIH/NCI Cancer Centre Support Grant P30 CA008748 and the Thompson Family Foundation sponsored research with a value of $250,000.00 USD.

As part of the Research grant, a brand new Sonoscape Video GI Endoscope (Gastroscope and Colonoscope) was donated to UITH (figure 10).

Figure10: Sonoscape Video GI Endoscope

► Furthermore, in August 2020, I was commissioned to set up the GI endoscopy unit, and also train Doctors and Nurses in GI Endoscopy at the Federal Medical Centre, Jalingo, Taraba State. The GI Endoscopy unit of the hospital has now been established and fully functional with Gastroscopy and Colonoscopy-diagnostic and therapeutic, in October, 2021(figure 11).

Figure 11: Olympus Video Endoscopy machine

Setting up a GI Endoscopy unit

In 2008, (Olokoba et al) carried out a study, and published the minimum requirements for setting up a GI endoscopy unit in a resource-poor environment which are highlighted below:

I. Infrastructure

a. Endoscopy suite (dedicated) with
   i. Patients' waiting/Reception area Nurses' & Doctors' room
   ii. Changing rooms (male & female) with conveniences
   iii. Endoscopy/Procedure room
   iv. Recovery room

b. Endoscopy equipment:
   i. Endoscopy tower
   ii. Light source/Processor/Monitor
   iii. Video Gastroscope and accessories
   iv. Video Colonoscope and accessories
   v. Suction machine
   vi. Scope washing trolleys
   vii. Biopsy forceps/Polypectomy snares/injection needles

c. Functional air conditioning system
d. Operating tables
e. Trolleys/Wheel chairs
f. Scope hanger
g. Wash hand basins
h. Electricity stabilizer
i. Drip stands

II. Staffing

a. Gastroenterologist &Endoscopist
b. Medical doctor assisting
c. Endoscopy nurses
d. Attendants
e. Biomedical engineer
f. Clerical staff

III. Consummables

a. Xylocaine throat spray
b. Cidex disinfectant (containing glutaraldehyde)

c. Enzymatic lotion
d. Sedatives – Diazepam/Midazolam
e. Gloves (surgical and disposable), Needles and syringes, Face masks etc
f. Intravenous fluids e.g Normal saline, dextrose/saline

MY CONTRIBUTIONS TO GASTROINTESTINAL ENDOSCOPY IN NIGERIA

A. Mr Vice Chancellor sir, in the course of my career as a Professor of Medicine and Consultant Gastroenterologist and Endoscopist, I have contributed to the setting up of GI Endoscopy units across the country in the following hospitals:

a. ECWA Hospital, Egbe, Kogi State (2006)

b. Private Hospitals in Ilorin (Eyitayo Hospital, Ilorin – 2006, and Crescent Gold Crown Hospital, Ilorin - 2009)

c. Modibbo Adama University Teaching Hospital (formerly Federal Medical Centre), Yola, Adamawa State (2006)

d. University of Ilorin Teaching Hospital, Ilorin, Kwara State (2011)

e. Federal Medical Centre, Jalingo, Taraba State (2020)

B. Mr. Vice Chancellor sir, furthermore in the course of my career as a Professor of Medicine and Consultant Gastroenterologist and Endoscopist, I have contributed to the training of Gastroenterologists some of whom are:

i. Dr. Musah Yusuf – Consultant Gastroenterologist at FTH, Ido, Ekiti State.

ii. Dr. Olusegun Obateru – Consultant Gastroenterologistat FMC, Lokoja, Kogi State.

iii. Dr. Matthew Bojuwoye – Senior Lecturer/ Consultant Gastroenterologist at University of Ilorin & University of Ilorin Teaching Hospital, Ilorin, Kwara State.

iv. Dr. Folorunsho Bamidele – Consultant Gastroenterologist at Musgrove Park Hospital, Somerset, United Kingdom.

v. Dr. Kenneth Okonkwo – Consultant Gastroenterologistat FMC, Owo, Ondo State.

vi. Dr. Mansa Aliyu – Consultant Gastroenterologist at University of Ilorin Teaching Hospital, Ilorin, Kwara State.

vii. Dr. Lawrence Ogbu – a Post-Fellowship Senior Registrar at University of Ilorin Teaching Hospital, Ilorin, Kwara State.

viii. I currently have four (4) Senior Registrars undergoing training under me:(three (3) at UITH, Ilorin, and one (1) at University of Benin Teaching Hospital, Benin, Edo State.

C. Mr. Vice Chancellor sir, in order to promote excellence in the field of Gastroenterology in Nigeria and the West African sub-region, I endowed a WACP College prize – the '**Abdulfatai Bamidele Olokoba'** prize for the best Fellowship candidate in the sub-specialty of Gastroenterology

MY CONTRIBUTIONS TO KNOWLEDGE IN GASTROINTESTINAL ENDOSCOPY

Mr. Vice Chancellor sir, in the course of my career as a Professor of Medicine and Consultant Gastroenterologist and Endoscopist, I carried out several research works on the human GI tract, and the field of GI endoscopy, and performed far more than a thousand OGDs, and hundreds of Colonoscopies in the process. In relation to diseases of the GI tract, I came across some disease entities of the GI tract that were hitherto rare in Africans. Some of these disease entities were published as Case Reports because of the perceived rarity in Africans. Also, I developed special interest in some disease entities such as Inflammatory Bowel Disease, Diverticulosis of the Colon, Colonic polyps etc. I found it difficult to comprehend why there should be racial differences in human GI tract diseases that are

neither genetic nor familial in nature. Furthermore, there was paucity of data on Endoscopic evaluation of the GI tract of Nigerians. The foregoing observations prompted me to focus my research on validation or otherwise of these racial differences in GI tract diseases, and also to explore the human GI tract using an Endoscope hence the title "**Looking through a tube to see the world within the tube…**"A select few of my research exploits are presented as follows:

Figure 12: the lecturer performing a GI endoscopy procedure

I. Gastrointestinal tract diseases in Nigerians

a. Indications for upper Gastrointestinal tract endoscopy

Upper GI tract endoscopy (UGIE) is one of the commonly performed endoscopic procedures that provides valuable information in patients with upper GI symptoms. It is usually performed on an outpatient basis primarily for diagnostic and/or therapeutic reasons. Data on the indications for UGIE was scanty from Nigeria, particularly, from the northern parts. Olokoba et al (2009) sought to review the indications for UGIE in three health facilities located in different regions of Northern Nigeria from July 2006 to December 2007. The endoscopy registers were examined over this period. The biodata and the indications for UGIE were reviewed. The settings of the study were three health facilities in different regions of Northern Nigeria, with recently established UGIE units in ECWA Hospital, Egbe, Kogi State; Eyitayo Hospital and Maternity Centre, Ilorin, Kwara State; and

Modibbo Adama University Teaching Hospital (formerly Federal Medical Centre), Yola, Adamawa State using different models of Gastroscopes namely: Olympus GIF P10, Olympus GIF XQ10 and Fujin on FG-100FP respectively. A total of 269 patients were found to have undergone UGIE in the health facilities during the period. Their ages ranged from 12-90 years with mean of 48.1+/-16.2 years. The indications for UGIE were dyspepsia 164(61.0%); UGI bleed 41(15.2%); GORD 26 (9.7%); gastric cancer11(4.1%); GOO 10 (3.7%); Acute PUD 4(1.5%); dysphagia, and epigastric mass 3 (1.1%) each; excessive salivation 2 (0.7%); anaemia, abdominal pain, chronic diarrhoea, haematochexia, and persistent vomiting 1(0.4%) each (table 1).
The conclusion of the study was that the commonest indication for UIGE was dyspepsia. This was similar to findings within and outside Nigeria.

Table 1: Indications for upper gastrointestinal endoscopy

Indications	Frequency	Percentage
Dyspepsia	164	61.0
UGI bleed	41	15.2
GORD	26	9.7
Gastric cancer	11	4.1
GOO	10	3.7
Acute PUD	4	1.5
Dysphagia	3	1.1
Epigastric mass	3	1.1
Excessive salivation	2	0.7
Anaemia	1	0.4
Abdominal pain	1	0.4
Chronic diarrhoea	1	0.4
Haematochexia	1	0.4
Persistent vomiting	1	0.4
Total	**269**	**100**

Keys: *UGI – Upper Gastrointestinal, GORD – Gastro-esophageal Reflux Disease, GOO – Gastric Outlet Obstruction, PUD – Peptic Ulcer Disease.*

b. Upper Gastrointestinal tract bleeding

Upper GI tract bleeding (UGIB) refers to blood loss within the intraluminal GI tract from any location between the upper oesophagus to the duodenum at the ligament of Treitz. The onset and severity of blood loss varies widely. Acute GI bleeding is a potentially life-threatening abdominal emergency that remains a common cause of hospitalization. There was no local data on the clinical presentation, endoscopic findings and the risk factors for UGIB in Ilorin. Olokoba et al (2009) sought to review the cases of UGIB in Ilorin. A retrospective review of the cases of UGIB was undertaken to cover an eighteen-month period from June 2006 to November 2007. The clinical presentation, endoscopic findings, and the risk factors which predisposed them to bleeding were evaluated. A total of thirty (30) patients had UGIB during the period under review. Twenty-three of the patients were males (76.7%) while seven were females (23.3%). Sixteen patients (53.3%) presented with melaena only; eleven patients (36.7%) presented with melaena and haematemesis only; while three patients (10.0%) presented with melaena, haematemesis and haematochexia. However, all the patients presented with melaena, haematemesis or haematochexia. The commonest clinical presentation of patients with UGIB was passage of melaena (53.3%). The commonest endoscopic finding was multiple sources of bleeding (66.7%) while the commonest risk factor for UGIB was Non-steroidal anti-inflammatory drugs (NSAIDs) use (36.7%)(table 2).

The conclusion of the study was that passage of melaena, multiple sources of bleeding, and NSAIDs use were the commonest clinical presentation, endoscopic findings, and risk factors respectively in patients with upper GI tract bleeding in Ilorin, Nigeria.

Table 2: Clinical presentation of upper gastrointestinal bleeding

Presentation	**Frequency (%)**
Melaena	16 (53.3)
Melaena + Haematemesis	11 (36.7)
Melaena + Haematemesis + Haematochexia	3 (10.0)
Melaena or Haematemesis or Haematochexia	30 (100.0)
Total	**30 100.0)**

c. Indications and findings at Colonoscopy

Colonoscopy is a safe and effective means of visual inspection of the large bowel from the distal rectum to the caecum. It may be carried out for diagnostic and or therapeutic reasons. There was a paucity of data on this procedure in Nigeria. Olokoba et al (2013) sought to determine the indications, findings, and diagnostic yield in Nigerians at colonoscopy.

This was a hospital-based cross-sectional study carried out in Ilorin, Nigeria from January 2010 to May, 2012. A total of 103 patients had colonoscopy. Seventy (68.0%) were males while 33 (32.0%) were females. The indications for colonoscopy were rectal bleeding 41(39.8%), suspected colon cancer 32 (31.1%), chronic constipation and chronic diarrhoea 9 (8.7%) each, abdominal/anal pain 5 (4.9%) each, suspected anorectal cancer and enterocutaneous fistula 2 (1.9%) each, faecal incontinence, occult GI bleeding, and post-colostomy for Hirschsprung disease 1 (1.0%) each. The Endoscopic findings were normal findings 21 (20.4%), diverticulosis 17 (16.5%), polyps 16 (15.5%), haemorrhoids16 (15.5%), anorectal cancer 13 (12.6%), angiodysplasia 12 (11.7%), colon cancer 8 (7.8%), colitis 7 (6.8%), anorectal ulcer 4 (3.9%), anal warts 2 (1.9%), anal fissure, caecaltumour, faecal impaction and proctitis 1(1.0%) each. The diagnostic yield was 79.6% (figures 13 and 14).

The conclusions of the study were that the commonest indication for colonoscopy was rectal bleeding, while the most frequent pathology was diverticulosis. The diagnostic yield was high.

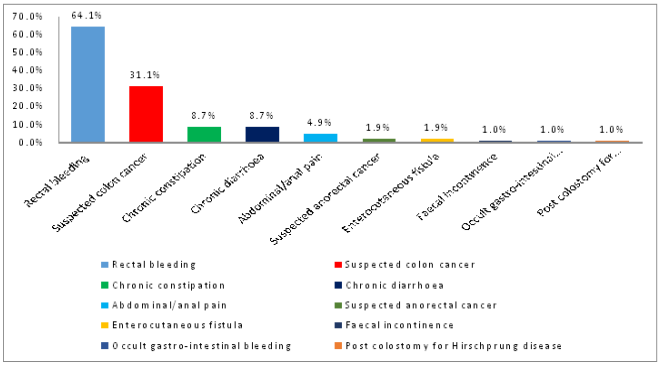


Figure 13: Indications for colonoscopy

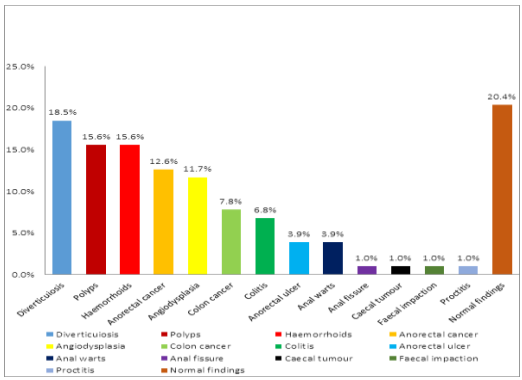


Figure 14: Findings at colonoscopy

d. Lower Gastrointestinal tract bleeding

Lower GI bleeding refers to blood loss of recent onset originating from a site distal to the ligament of Treitz. It may manifest as haematochezia (passage of maroon or bright red blood or blood clots per rectum). Information was scanty on the

subject in Nigerians. Olokoba et al (2013) set out to determine the colonoscopic findings in Nigerians with lower GI bleeding in Ilorin. This was a hospital-based cross-sectional study carried out from January 2010 to April, 2013. A total of 174 patients had colonoscopy carried out on them. Out of these, 78 patients had lower GI bleeding comprising 52 (66.7%) males and 26(33.3%) females. Their age ranged from 4 to 90 years with a mean of 53.3+/-19.9 years. The colonoscopic findings were haemorrhoids 28(35.9%); diverticulosis 20(25.6%); rectal cancer 13(16.7%); colonic polyps 12(15.4%); angiodysplasia 9(11.5%); proctitis 4(5.1%); rectal polyps 4(5.1%); anal warts 3(3.8%); anal cancer 2(2.6%); colitis 2 (2.6%); colon cancer 1(1.3%); normal findings 4 (5.1%) (figure 15).

The conclusion of the study was that haemorrhoids, diverticulosis, colo-rectal cancer, and polyps in decreasing order were the commonest findings in Nigerians with lower GI bleeding.

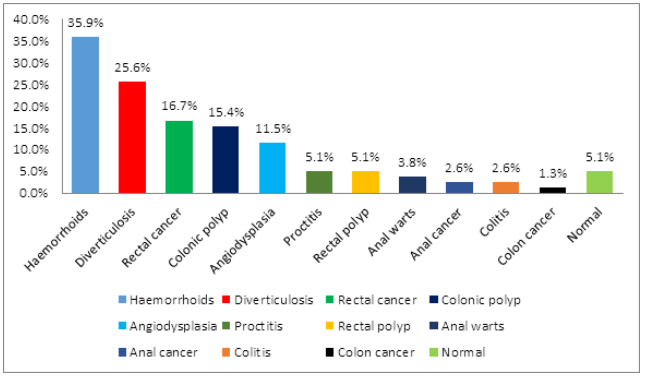


Figure 15: Colonoscopic findings in Nigerians with lower GI bleeding

e. Inflammatory Bowel Disease

Inflammatory bowel disease (IBD) is an idiopathic disease caused by a dysregulated immune response to host intestinal microflora. The two major types of IBD are Ulcerative colitis (UC), which is limited to the colonic mucosa, and Crohn's

disease (CD), which can affect any segment of the GI tract from the mouth to the anus, involves "skip lesions," and is transmural. There is a genetic predisposition for IBD, and patients with this condition are more prone to the development of malignancy. The disease may range from mild, moderate to severe forms. The exact aetiology is still unknown, however it is recognized as a multifactorial polygenic disease. In recent times, the incidence of IBD has increased globally especially in developing countries, but varies within different geographic areas. The incidence is low in Africa, however IBD occurs at higher incidence in Europe, the United Kingdom, and North America.

I present to you a 25-year-old black Nigerian student who came to our GI clinic with chronic leg ulcer, recurrent diarrhoea, weight loss, and darkening of the skin of 8 years duration. He had visited several hospitals, and used different medications without improvement of his symptoms. Physical examination revealed a chronically ill-looking young man, emaciated, with finger clubbing, and hyper-pigmented skin lesions in both lower limbs. (figure 16). He had colonoscopy done. The findings were consistent with IBD- Ulcerative Colitis (figures 17 and 18). Histology of biopsies taken was consistent with Ulcerative colitis. He was commenced on steroids, and Aminosalicylates which led to a dramatic improvement of his symptoms.

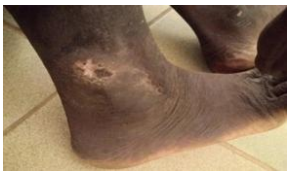


Figure 16: *Hyperpigmented skin lesions*

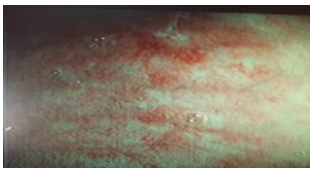


Figure 17: *Inflamed Colon*

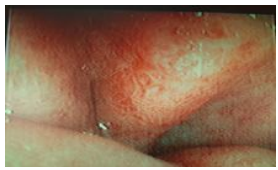


Figure 18: *Inflamed Rectum*

f. Diverticulosis of the Colon

Diverticular disease of the colon is a herniation of the mucosa and sub-mucosa through weak points in the colonic muscular walls to form narrow-necked pouches. It is well recognized in western countries. The true incidence of colonic diverticulosis (CD) is unknown. But comparing barium studies, earlier and recent autopsies suggest that the prevalence of the disease is increasing over time globally, and in Africa. Diverticulosis is most common in the sigmoid colon which is the area with the highest intra-luminal pressure, less compliant, and smallest. It is commoner in individuals over 60years of age. Both genders are affected equally. The most significant risk factors for CD include highly refined low-fibre diet, ageing, high intra-luminal pressure, increase in type III collagen, and deposition of elastin. CD is more common in developed and Western nations than in Asia, and Africans.

Some studies reported that CDis rare in Africans because of our high-fibre diet, and the traditional squatting positions adopted while defaecating as different from Caucasians who consume low-fibre diet and their adoption of a sitting posture while defaecating. This arouse our curiosity on the possible impact of this simple social behaviour on the occurrence of Diverticulosis. Using a GI endoscope, (Olokoba et al, 2012) reported 2 cases of CD in native Nigerians. This was followed up in 2014 by another study by (Olokoba et al) who sought to answer the question "Is Colonic Diverticulosis rare in Nigerians?" A review of 174 cases of colonoscopies was carried out. Twenty-seven (15.5%) had Diverticulosis, and this was positively correlated with age, and male gender ($p<0.05$), while rectal bleeding was the commonest presentation (figures 14 and 15).

The conclusion from the study was that Colonic diverticulosis was common in Nigerians, and it positively correlated with increasing age, and male gender. Also, rectal bleeding was the commonest presentation. (figures 19 and 20).

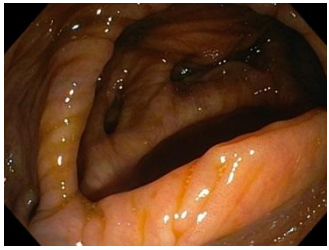


Figure 19: *Colonic diverticulosis*

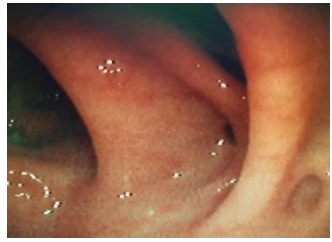
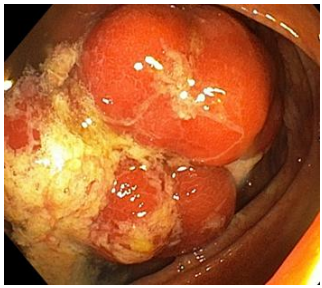


Figure 20: *Diverticulosis of the Colon*



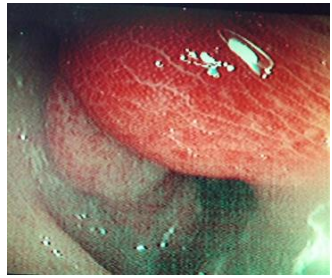


Figure21: *Colon cancer* ***Figure22:*** *Colon cancer*

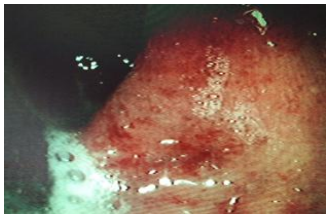


Figure 23: *Colon cancer*

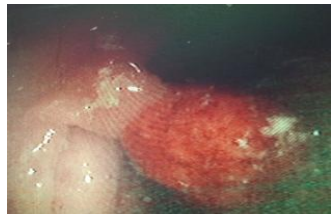


Figure 24: *Colonic polyp*

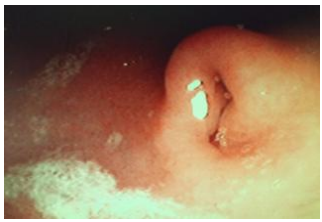


Figure 25: *Pancreatic Rest*

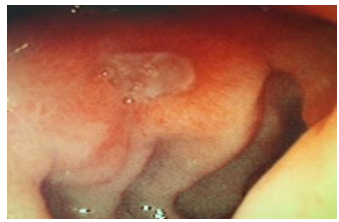
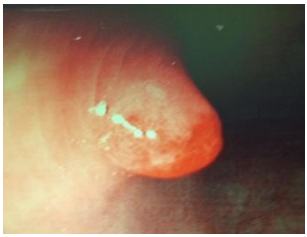


Figure 26: *Duodenal ulcer co-existing with duodenal diverticula*



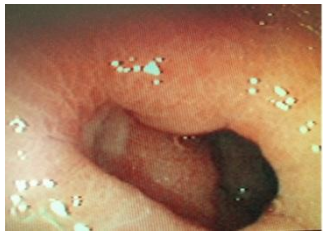


Figure 27: *Colonic polyp* ***Figure 28:*** *Duodenal Ulcer*

Mr. Vice Chancellor sir, furthermore in the course of my research into GI tract diseases, I came across some rare occurrences which I will highlight as follows:

II. **Rare GI diseases/occurrences**:

a. Temporomandibular joint dislocation at upper GI endoscopy

Temporomandibular joint (TMJ) dislocation is an infrequent condition which may occur due to a shallow mandibular fossa in the temporal bone or an under-developed condyle of the mandible. Connective tissue diseases such Marfan's syndrome or Ehlers-Danlos syndrome may predispose to it. It may also occur spontaneously while yawning, yelling, singing etc. It may be reduced by close or open reduction. Olokoba et al (2007) reported the very first case of TMJ dislocation in Nigeria, and only the fifth in the world in a 31-year-old HIV-positive Nigerian man during Gastroscopy for dyspepsia (figure 29).

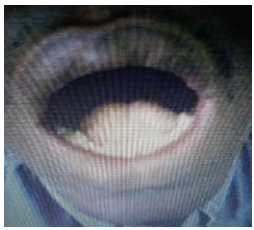


Figure 29: *Temporo-mandibular joint dislocation*

b. Gastric diverticulum

Gastric diverticulum (GD) is an out-pouching of the stomach that has similar characteristics to diverticula in other parts of the GI tract. They are relatively rare findings. The first case of Endoscopic diagnosis of GD in Nigeria was reported by Olokoba et al (2008) in a 33-year-old Nigerian woman resident in Ilorin who presented with dyspepsia of a few weeks duration. Gastroscopy revealed Gastric diverticulum. Her symptoms improved with the use of proton pump inhibitors (PPIs) (figure 30).

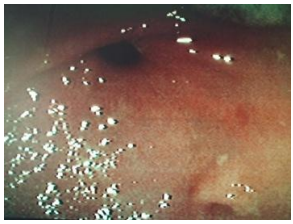


Figure 30: *Gastric antral diverticulum*

c. Duodenal diverticulum co-existing with duodenal ulcer

Duodenal diverticula (DD) are characterized by the presence of sac-like mucosal herniations through weak points in the duodenal wall. DD co-existing with a bleeding duodenal ulcer is rare. Olokoba et al (2009) reported the first case of Endoscopic diagnosis of DD co-existing with duodenal ulcer in a 40-year-old banker resident in Ilorin who presented with abdominal pain and malaena following NSAID use. He had no vomiting, haematemesis or haematochezia. Gastroscopy revealed DD co-existing with duodenal ulcer. He was given PPIs, and a repeat endoscopy confirmed a healed ulcer (figure 31).

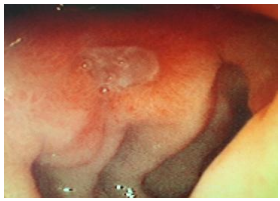


Figure 31: *Duodenal diverticulum co-existing with duodenal ulcer*

d. Oesophageal intramural pseudodiverticulosis

Oesophageal intramural pseudodiverticulosis (OIPD) is a rare condition found in less than 1% of oesophagrams. It is characterized by multiple small rounded cavities in the oesophageal wall. It may occur at any age, but is more common between 50 and 70 years. It is often associated with oesophageal stricture, gastro-oesophageal reflux disease, achalasia, oesophageal candidiasis and chronic oesophagitis. Bamidele, Olokoba, et al (2019) reported a case of a 40-year-old Nigerian man who presented with recurrent dysphagia, but no odynophagia, vomiting or weight loss. Upper GI endoscopy revealed typical features of OIPD (figure 32).

The patient was managed medically with resolution of the dysphagia. This Case report highlights the occurrence of this rare but benign cause of dysphagia in Nigeria.

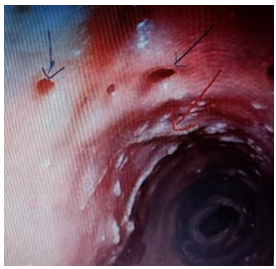


Figure 32: *OGD showing small oval cavities with smooth edges in oesophageal wall (blue arrow) and whitish plaques (red arrow) attached to the oesophageal mucosa*

e. Foreign body in the stomach

Foreign bodies (FBs) in the GI tract are objects that are accidentally or intentionally ingested. These objects range from buttons, pins, coins, toothpicks, crayons, small batteries, needles, fish and chicken bones, dentures etc. FBs are more commonly ingested by children, and may be asymptomatic or result in life threatening complications. Olokoba and Obateru (2011) reported

a case of a 43-year-old civil servant who presented with a 24-hour history of accidental ingestion of a metallic bottle cap while drinking alcohol at a poorly illuminated bar at night. The FB was confirmed with a plain abdominal X-ray. (figure 33). At OGD, the metallic bottle cap was seen in the stomach, and removed endoscopically with a polypectomy snare (figures 34 and 35).

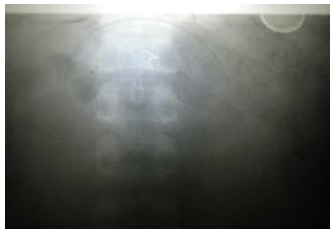


Figure 33: *X-ray showing the metallic bottle cap in the stomach (arrowed)*

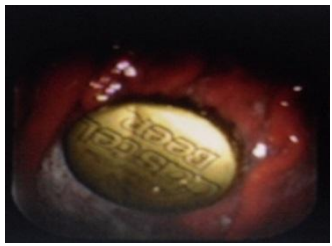


Figure 34: *OGD showing the metallic bottle cap (long arrow) in the stomach*

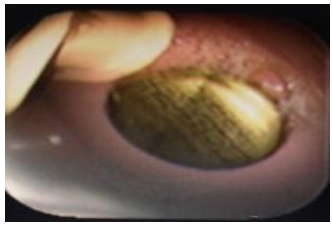


Figure 35: *Metallic bottle cap after removal (arrowed)*

f. Endoscopic removal of impacted oesophageal foreign body

Ingestion of foreign bodies (FBs) is a familiar problem in paediatric practice. Demand and usage of button batteries have risen due to the increase in the usage of technological devices. They are frequently inadvertently placed by children in their ears, noses and mouth, and occasionally are swallowed and lodged along the upper aerodigestive tract. Obateru, Olokoba et al (2016) reported a case of a 7-year-old boy who presented with a 10-hour history of vomiting and chest pain following ingestion of a button-like metallic object. A plain neck and chest X-ray revealed a rounded radio-opaque object around the sternal angle of Louis. (figure 36).OGD revealed an impacted round metallic object around the mid-oesophagus which was removed endoscopically (figures 37, 38, and 39).

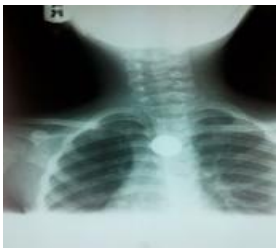


Figure 36: *X-ray showing impacted FB*

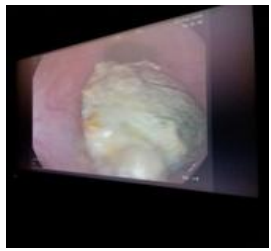


Figure 37: *Endoscopic removal of FB*

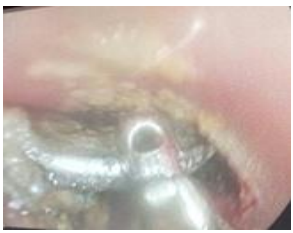


Figure 38: *Foreign body*

Figure 39: *FB after removal*

g. Familial adenomatous polyposis syndrome

Familial adenomatous polyposis syndrome (FAPS) is a rare autosomal dominant genetic disease that is characterized by the presence of hundreds to thousands of polyps in the colon and rectum. Untreated, it inevitably leads to colon cancer. About 1% of all colorectal cancers (CRC) are caused by FAPS. Bojuwoye, Olokoba et al (2018) reported 2 cases of FAPS. The first case was a 46-year-old Nigerian male cleric who presented with an 8-month history of dyspepsia, progressive weight loss, diarrhoea alternating with constipation, occasional haematochezia and painful peri-umbilical swellings. At presentation, he was pale, had discrete non-tender right inguinal lymphadenopathy and Sister Mary Joseph (SMJ) nodules. Digital rectal examination (DRE) revealed melaena. OGD revealed multiple sessile polyps in the antrum and a solitary polyp in the duodenal bulb. Histology of the gastric polyps revealed features of dysplasia. Colonoscopy revealed hundreds of polyps of varying sizes extending from the rectum to the ascending colon (figure 40). Two large polyps were seen at approximately 15cm and 90cm from the anal verge. (figures 41 and 42). Biopsies were taken from these, and one of the pedunculated polyps seen at 45cm from the anal verge was snared.(figure 43). The histology of the large polyps was tubulovillous adenoma with low grade dysplasia whereas that of the snared polyp was tubular adenoma with low grade dysplasia. The histological diagnosis of the biopsies of the SMJ nodules was metastatic adenocarcinoma.

The second case was a 49-year-old native Nigerian male artisan (upholstery maker), who was referred for colonoscopy on account of a 2-month history of colicky left lower abdominal pain, haematochezia and progressive generalized body weakness. Colonoscopy revealed numerous sessile and pedunculated polyps of varying sizes seen in the rectum and colon, and a sigmoid mass (figures 44 and 45). The histological diagnosis of the tumour was an adenocarcinoma.

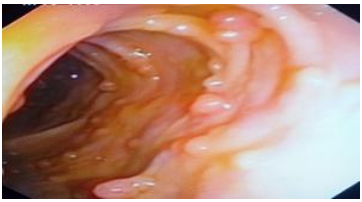


Figure 40: *Multiple polyps of varying sizes in the colon*

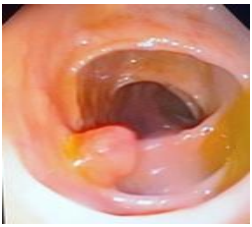


Figure41:*Polyp*

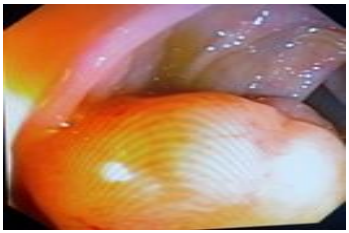


Figure 42: *Polyp*

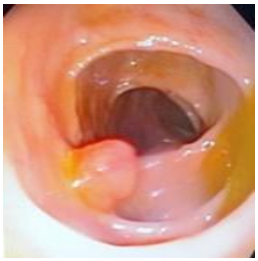


Figure 43: *Stump of snared polyp*

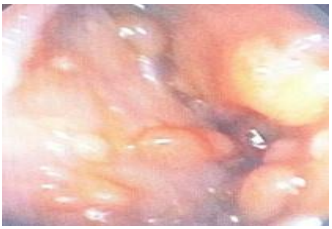


Figure 44: *Multiple sessile polyps*

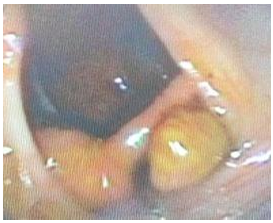


Figure 45: *Pedunculated polyps in the colon*

h. Angiodysplasia of the colon

Angiodysplasias, arteriovenous malformations or angiomas are the commonest vascular lesions of the GI tract. They are enlarged, fragile blood vessels in the colon. It is a common cause of lower GI bleeding in the elderly. It may be asymptomatic and discovered incidentally during colonoscopy. Patients may present with haematochezia, melaena, positive occult blood test or iron deficiency anaemia. It may present as an

isolated lesion or multiple vascular lesions. The exact cause of vascular ectasia is not known but it is thought to occur due to ageing and degeneration of blood vessels. Olokoba et al (2012) reported 2 cases of Angiodysplasia of the colon in two Nigerians. The first was an 85-year-old Nigerian farmer who presented with constipation, left-sided abdominal pain and weight loss all of two weeks duration. Colonoscopy revealed an area of dilated tortuous blood vessel (vascular ectasia) in the wall of the descending colon approximately 45cm from the anal verge, with no features of bleeding. The second patient was a 30-year-old female trader who presented with two days history of massive haematochezia of about 7 episodes prior to presentation with an estimated blood loss per episode of about 300 ml. There were clinical features of shock. Packed cell volume at presentation was 14%. She was transfused with 4 units of fresh whole blood. After stabilization, colonoscopy was done 5 days after bleeding had stopped, which revealed an area of erosion with mucosal blood clot about 25 cm from the anal verge. An area of angiodysplasia was seen (figure 46).

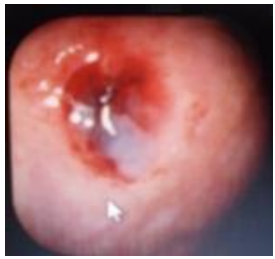


Figure 46: *Area of mucosa blood clot (angiodysplasia)*

i. Dyspepsia in the young could be Gastric cancer

Worldwide, gastric cancer is one of the most common cancers in the GI tract, and it is the fourth most common cancer, and the second leading cause of cancer-related deaths, with about 700, 000 deaths annually. Typically, the average age of patients who suffer from gastric cancer is approximately 60 years; on occasion, however, about 1-3% of gastric cancer cases occur in

patients less than 30 years of age. Olokoba et al (2013) reported 3 cases of Gastric cancer in the young which presented as dyspepsia.

The first was a 34-year-old male civil servant who presented with 6 months history of upper abdominal discomfort associated with recurrent vomiting of stale food residue, anorexia, early satiety and weight loss. He had no history of dysphagia, odynophagia or haematemesis. He also had no history of ingestion of alcoholic beverages, smoked food or a family history of GI malignancy. Physical examination revealed a chronically ill-looking, pale young man, with no lymph node enlargement. Abdominal examination showed epigastric tenderness, and succussion splash, but DRE was essentially normal. Upper GI endoscopy findings revealed a distended stomach with a circumferential, firm, ulcerated mass with necrotic surface at the antrum obstructing the gastric outlet, and a deformed pyloric ring making it difficult to intubate the duodenum (figure 47). Histology of the biopsy specimen showed a moderately differentiated adenocarcinoma of the gastric mucosa with no evidence of H. pylori in the biopsy sample (figure 48).

The second case was a 29-year-old male farmer who presented with 4months history of epigastric pain associated with recurrent vomiting, anorexia, early satiety and weight loss. He also had haematemesis and melaena. He had a history of ingestion of alcoholic beverages and smoked food, but there was no history of cigarette smoking, and no family history of GI malignancy. Physical examination revealed a chronically ill-looking, pale young man, but with no palpably enlarged peripheral lymph nodes. Abdominal examination revealed epigastric tenderness, and a DRE revealed melaena. Upper GI endoscopy showed a dilated stomach with huge friable mass with necrotic surface, seen at the antral area of the stomach with distortion of the local anatomy (figure 49). Histological examination of the biopsy specimen showed a poorly

differentiated Adenocarcinoma of the gastric mucosa infiltrating and dissecting the muscularis propria; there was no evidence of H. pylori in the biopsy sample (figure 50). He had a partial gastrectomy, and chemotherapy, and was followed up in the clinic.

The third case was a 38-year-old female primary school teacher who presented in August 2012 with a 12-month history of recurrent epigastric pain, which responded initially to anti-ulcer medications, but later developed anorexia, early satiety, weight loss and vomiting. She had no history of dysphagia or odynophagia. She also had no history of intake of smoked foods, alcohol consumption, cigarette smoking or family history of GI malignancy. Physical examination was unremarkable except for palor and epigastric tenderness. Upper GI endoscopy revealed a huge friable rounded mass at the antrum of the stomach making it impossible to intubate the duodenum. Biopsy and histology showed malignant epithelial cells in poorly formed glands. There was no evidence of H. pylori in the biopsy sample. She was offered surgery and chemotherapy. Staining for H. pylori in all the three patients was carried out with Haematoxillin and Eosin, and Giemsa staining, although immunohistochemistry would have been better in staining for the organism.

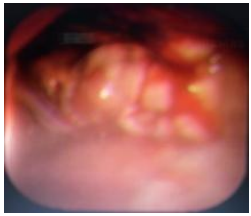


Figure 47: *Huge friable mass the antrum of the stomach*

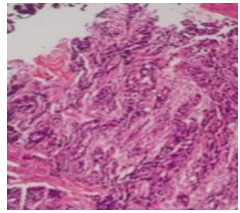


Figure 48: *Histology of the biopsied at mass showing moderately differentiated adenocarcinoma*.

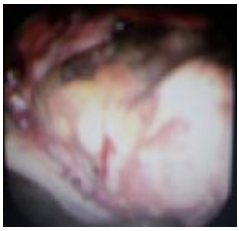


Figure 49: *Ulcerated friable mass at the antrum of the stomach arrowed.*

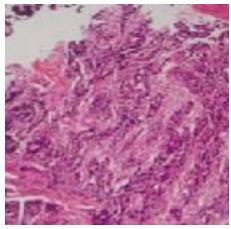


Figure 50: *Biopsied mass showing poorly-differentiated adenocarcinoma*

j. Massive Rectal bleeding from Colonic Diverticulosis

Colonic diverticular bleeding (CDB) in adults, is the commonest cause of overt lower GI bleeding. CDB can present as brisk haematochezia (bright red or maroon coloured blood), accounting for 30-50% of cases of massive rectal bleeding. Olokoba et al (2015) reported a case of massive CDB in a 75-year-old man who is a known hypertensive and diabetic resident in Offa, Kwara State who had multiple blood transfusion to correct his anaemia. Colonoscopy revealed bleeding from multiple colonic diverticula (figures 51, 52, and 53).

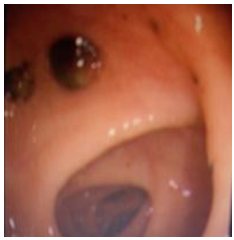


Figure51: *Bleeding Colonic diverticula*

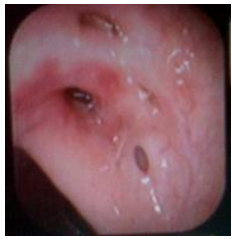


Figure52*: Colonic diverticula*

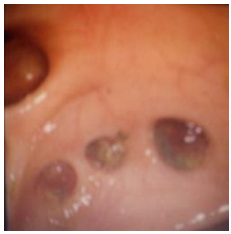


Figure53: *Multiple Colonic diverticula*

k. Colonoscopic examination of rectal bleeding in children

Rectal bleeding is a relatively uncommon but important occurrence in children. When it occurs, it could be a source of great anxiety for both the child and parents. Rectal bleeding in children occurs in 1% of pre-school, and school children. Fortunately, most cases in children are due to aetiologies that have little morbidity. A vast majority of rectal bleeding in children is benign. Olokoba et al (2015) reported 2 cases of recurrent rectal bleeding in a 4-year-old, and 9-year- old girls in Ilorin. Both had colonoscopy which revealed pedunculated juvenile polyps which were removed endoscopically (figures 54 and 55). The girls have remained symptom-free since then.

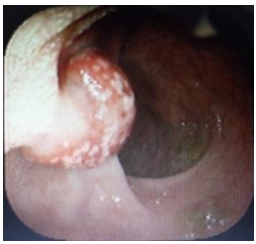


Figure 54: *Colonic polyp*

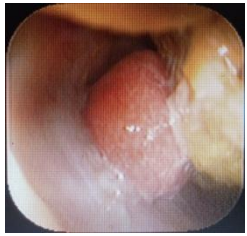


Figure 55: *Rectal polyp*

I. Colonic carcinoid tumour

Carcinoid tumoursare rare slow-growing neuroendocrine tumours originating from the cells of the neuroendocrine system (enterochromaffin or Kulchitsky's cells). These tumours have been reported in a wide range of organs but it most commonly involves the lungs, bronchi, and GI tract. The incidence of carcinoid tumour is approximately 1-2 cases per 100,000.Other studies have found carcinoids in about 1% of necropsies. Over two-thirds of carcinoid tumours are found in the GI tract. The release of serotonin and other vasoactive substances into the systemic circulation is thought to cause the carcinoid syndrome.

Obateru, Olokoba et al (2017) reported a case of a56-year-old man who presented with a year history of right sided

lower abdominal fullness, audible bowel sounds and occasional diarrhoea, nausea, vomiting and epigastric pain. No associated history of haematochezia or passage of melaena. Colonoscopy revealed a ceacal mass occupying more than 2/3rd of the colonic lumen (figure 56). Histology confirmed Carcinoid tumour(well differentiated neuroendocrine tumour), which was surgically removed (figures 57 and 58).

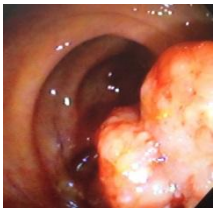


Figure 56: *Caecal carcinoid*

Figure 57: *Resected Caecal tumour*

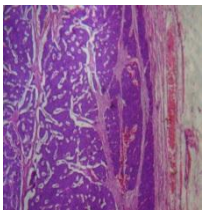


Figure 58:*Histology of Carcinoid tumour*

CHALLENGES OF GASTROINTESTINAL ENDOSCOPY IN NIGERIA

Mr. Vice Chancellor sir, the challenges of establishing a GI endoscopy unit in a resource-poor setting were identified and published by Olokoba et al (2008). This publication won the second-best paper presentation at the Society for Gastroenterology and Hepatology in Nigeria (SOGHIN) annual scientific conference in Kano in 2008.

The challenges of GI endoscopy in Nigeria can be categorized into:

i. **Manpower**

There is a dearth of Gastroenterologists and Endoscopists in Nigeria. There are far less than 100 to serve a population of more than 200million. Similarly, there is a dearth of Endoscopy Nurses, Endoscopy technicians, and Biomedical engineers with competence in the maintenance and repair of GI Endoscopes. This manpower shortages has been further compounded by Brain drain. Some of the factors which have contributed to this are the 'pull' and 'push' factors, lack of job satisfaction, poor work environment and conditions, poor remuneration, insecurity etc.

ii. **Equipment**

Endoscopy equipment are very sophisticated, delicate, and expensive. Available Endoscopy equipment are obsolete, and some of these break down frequently leading to Endoscopy holidays. There are maintenance issues such as non-availability of spare parts, non-existence of maintenance and repair centres. Also, there is a high cost of accessories and consumables such as bands, forceps, snares, sclerosants, coagulation and application clips etc.

iii. **Poor funding**

The general under-funding of the Health sector below the 15% Abuja declaration of 2001 also affects, and partly contributes to inadequate funding of GI endoscopy services in our hospitals.

iv. **Limited scope of GI Endoscopy services**

Gastrointestinal Endoscopy services are mainly diagnostic with limited capacity for therapeutic or interventional endoscopy such as ERCP, MRCP, EUS, Capsule Endoscopy etc. Today, there are only four (4) centres in Nigeria which offer ERCP services namely: Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Afe Babalola University Ado (ABUAD) Multi-system Hospital, Lagoon Hospital, and Marcell Ruth Hospital. MRCP is being done but EUS is unavailable.

v. **Lack of availability and accessibility of GI Endoscopy services**

Gastrointestinal Endoscopy services in public and private facilities are grossly inadequate, and where available is not accessible due partly to the high cost of services, and their location in urban areas.

vi. **Lack of regulation and standardization of GI Endoscopy services**

There is no regulation or standardization of GI Endoscopy services. This makes quality control, and quality assurance challenging.

vii. **Corruption**

The general corruption pervading our healthcare system, and healthcare delivery also affects GI Endoscopy services with issues such as contract inflation, mismanagement of resources etc.

RECOMMENDATIONS

Mr. Vice Chancellor Sir, my plea is that we should not allow people suffer or die from GI tract diseases because of the challenges enumerated above. Therefore, my major recommendations include the following:

i. The Postgraduate Medical Colleges – National Postgraduate Medical College of Nigeria (NPMCN), West African College of Physicians (WACP) and West African College of Surgeons (WACS) should review their curriculum for the training of Gastroenterologists and Surgeons by insisting on minimum competences in GI Endoscopy for certification as Specialists.

ii. Adequate funding of GI Endoscopy services which should be need-based

iii. Public Private Partnership (PPP) in the provision of GI Endoscopy services

iv. Training and re-training of Gastroenterologists and Endoscopists

v. Standardization and regulation of GI Endoscopy services by Government, and professional bodies such as SOGHIN.

vi. Use of e-learning platforms and telemedicine including videos, live streaming and live demonstrations of procedures to compliment hands-on training needs

vii. Manuals and guidelines should be developed and regularly updated to guide GI Endoscopy practice as is done in other climes.

viii. International guidelines on GI Endoscopy should be harmonized, and adapted to our local practice needs.

ix. Encourage use of linkages and collaboration with international professional GI and Endoscopy associations and societies with the possibility of exchange programmes to enable knowledge and skills transfer.

x. The Society for Gastroenterology and Hepatology in Nigeria (SOGHIN) should play a more robust role in standard setting, and GI practice regulation.

xi. The World Gastroenterology Organization (WGO) Lagos training centre (WGO-LTC) in Lagos University Teaching Hospital (LUTH), Lagos should be put to more effective use, and upgraded to a truly international standard.

   a. SOGHIN should take full control of the centre

   b. Regular training sessions with didactic lectures and hands-on should be organized

   c. Resource persons should be drawn from both local and international faculties

   d. Prompt repairs and maintenance of the centre's equipment should be effected.

xii. Establishment of GI endoscopy repair and maintenance centres across the country

xiii. All the GI endoscopy centres across the country should be adequately equipped, staffed, and funded.

xiv. The establishment of Centres of excellence in GI endoscopy which should be fully equipped with state-of-the-art facilities, staffed, and funded to serve as an apex referral centre for services, training, and research.

xiv. Gastroenterology and Endoscopy training programme should provide an intellectual environment for acquiring the right knowledge, skills, clinical judgement, attitude and values of professionalism that are essential to the practice of GI endoscopy.

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Mr. Vice Chancellor Sir, distinguished guests, ladies and gentlemen. In all of this, which of the favours of my Lord can I deny? I am immensely grateful for your physical presence and rapt attention. God bless you all, Amin.

Prof. Abdulfatai Bamidele Olokoba family

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